UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,890	09/22/2003	Hajime Harashima	Q77475	4268

23373	7590	07/31/2006

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EXAMINER
PEIKARI, BEHZAD

ART UNIT	PAPER NUMBER
2189	

DATE MAILED: 07/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

  4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

  a)☒ All b)☐ Some * c)☐ None of:

    1.☒ Certified copies of the priority documents have been received.

    2.☐ Certified copies of the priority documents have been received in Application No. _____.

    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   In response to the amendment and associated remarks filed on June 28, 2006,

the finality of the previous Office action is hereby withdrawn.

Claim Objections

2.   The previous objection to claim 12 is withdrawn due to clarification in amendment

filed June 28, 2006.

Claim Rejections - 35 USC § 112

3.   The previous rejection under 35 U.S.C. 112, second paragraph, is withdrawn due

to amendment filed June 28, 2006.

Claim Rejections - 35 USC § 102

4.   The previous rejection under 35 U.S.C. 102 is withdrawn due to the remarks

attached to the amendment filed June 28, 2006.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains.
Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 1-2, 4-5, 12-13 15-16 and 18-19 are rejected under 35 U.S.C. 102(e) as

being anticipated by Kalman (US Patent 6,820,211).

        (A)   As per claim 1, Kalman discloses a data writing apparatus for writing data

into storage means (Col 1, Lines 63-66), comprising:

                ~~an upper-rank~~ a processor unit (Fig 1, Ref 12);

                a first storage means, ~~where data to be written~~, wherein said first storage

has a redundancy structure [RAID provides parity bits and striping, giving a redundancy

structure (Fig 1, Ref 23; Col 4, Lines 22-26)]; and

                a control unit which writes data in said first storage means in response to a

command from said ~~upper-rank~~ processor unit (Fig 1, Ref 22)

wherein the control unit ~~and~~ includes a second storage means,

                ~~second storage means~~ (Fig 2, Ref 108), and

                a logical disk [RAID is a logical disk] writing/reading means for writing data

in said second storage means ~~data writing of which~~ when ~~at an address in said first~~

~~storage means is~~ instructed by said ~~upper-rank~~ processor unit (Fig 3A, Ref 216, 218)

and reporting completion of writing to said ~~upper-rank~~ processor unit [the wait of Kalman

for the next data request (Fig 3A, Ref 208) after storing data from request on another

storage medium (Fig 3A, Ref 218) is an indicator of completion], wherein the processor

instructs the writing of data and the control unit writes the data in said second storage

means when a redundancy destruction occurs in said first storage unit (Fig 3A, Ref

204), the data written to said second storage unit at said corresponding to an address of

the redundancy destruction of said first storage means [The data is written to said

second storage unit corresponding to an address of the redundancy destruction of said

first storage means since the data must placed in such a way that it can be written back

from the NVRAM into the storage medium so that the storage medium can come back

online (Fig 3A, Ref 222)].

(B)   As per claim 2, Kalman discloses the data writing apparatus according to

claim 1, wherein said control unit (Col 3, Lines 57-61) further comprises a logical disk

[RAID] monitoring means which verifies if said redundancy destruction at said

corresponding address of said first storage means has been recovered (Fig 3A, Ref

220), and when said logical disk monitoring means verifies that said redundancy at said

corresponding address of said first storage means has been recovered, said logical disk

writing/reading means reads data written in said second storage means and writes said

data at said corresponding address in said first storage means (Fig 3A, Ref 222).

(C)   As per claim 4, Kalman discloses the data writing apparatus according to

claim 1, wherein said second storage means is a non-volatile storage means or a

volatile storage means which has an independent power supply (Col 3, Lines 42-49).

(D)   As per claim 5, Kalman discloses the data writing apparatus according to

claim 1, wherein said second storage means retains data written in said second storage

means, by said control unit until said data is written in said first storage means [In order

to update the drive, data must be stored until it is written in first storage means (Fig 3A,

Ref 222)].

(E)   As per claim 11, Kalman discloses a data writing apparatus for writing data

into storage means, comprising:

processor;

a first storage means, comprising redundancy structure wherein data and

redundant data are written when instructed by a processor [RAID device, storing data

and redundant data as parity bits (Fig 1, Ref 23), if data of a size equal to or smaller

than a size of said redundant data is destroyed, said first storage means ensuring data

by repairing said data from remaining data (Fig 3A, Ref 222);

a control unit which writes data in said first storage means in response to a

command from said processor (Fig 1, Ref 22) and includes

a second storage means (Fig 2, Ref 108), and

a logical disk [RAID is a logical disk] writing/reading means for writing data in

said second storage means when instructed by said processor unit processor unit (Fig

3A, Ref 216, 218) and reporting completion of writing to said processor unit [the wait of

Kalman for the next data request (Fig 3A, Ref 208) after storing data from request on

another storage medium (Fig 3A, Ref 218) is an indicator of completion], wherein the

processor instructs the writing of data and the control unit writes the data in said second

storage means when a redundancy destruction occurs in said first storage unit (Fig 3A,

Ref 204), the data written to said second storage unit corresponding to an address of

the redundancy destruction of said first storage means [The data is written to said

second storage unit corresponding to an address of the redundancy destruction of said

first storage means since the data must placed in such a way that it can be written back

from the NVRAM into the storage medium so that the storage medium can come back

online (Fig 3A, Ref 222)].

(F)   As per claim 12, Kalman discloses a method for writing data into storage

means where data to be written has a redundancy structure (Col 1, Line 63 – Col 2,

Line 1), comprising the steps of:

A) when a redundancy destruction occurs at an address in a first storage

means, wherein the first storage means has a redundancy structure [The redundancy

structure is the parity bits provided by the RAID system (Fig 3A, Ref 204, 212)], writing

data in said second storage means data as instructed by a processor, said data

corresponding to an address of redundancy destruction in said first storage means

[The data request given by the processor can not be written to the first storage means,

thus it is forwarded to a second storage means as described, the address corresponds

to an address in the first storage means since it must later be written into the first

storage means (Fig 3A, Ref 216, 218 and 222)]; and

B) reporting completion of writing data in said second storage means to

said processor [the wait of Kalman for the next data request (Fig 3A, Ref 208) after

storing data from request on another storage medium (Fig 3A, Ref 218) is an indicator

of completion].

(G)   As per claim 13, Kalman discloses the method according to claim 12,

further comprising the steps of:

C) verifying if redundancy at said address of said redundancy destruction

of said first storage means has been recovered (Fig 3a, Ref 220);

D) when recovery of said redundancy is verified, reading data written in said second storage means (Fig 3A, Ref 222); and

E) writing said data at said address in said first storage means (Fig 3A, Ref 222).

(H)   As per claim 15, Kalman discloses a method for writing and reading data into and from storage means where data to be written has a redundancy structure (Col 1, Line 63 – Col 2, Line 1), comprising the steps of:

A) when a redundancy destruction occurs at an address in a first storage means, writing data in a second storage means as instructed by an processor(Fig 3a, Ref 216, 218);

B) reporting completion of writing said data in said second storage means to said processor [the wait of Kalman for the next data request (Fig 3A, Ref 208) after storing data from request on another storage medium (Fig 3A, Ref 218) is an indicator of completion];

C) reading data corresponding to a redundancy destruction in the first storage means as instructed by said processor. (Fig 3A, Ref 210, 212)

(I)   As per claim 16, Kalman discloses the method according to claim 15, further comprising the steps of:

D) when recovery of said redundancy is verified, reading the data written in said second storage means and writing said data at said address in said first storage means (Fig 3A, Ref 222).

(J)   As per claim 18, Kalman discloses a computer program capable of running

on a computer so that the computer performs said steps of claim 12 [a computer

program running on a computer is inherent in controlling a controller performing the

steps of claim 12].

(K)   As per claim 19, please see rejection of claim 1 above.

Kalman teaches "reporting completion of writing" or "waiting" with respect to writing

data in a first storage means (note column 6, lines 12-40, or column 5, lines 53-56), but

fails to teach such "reporting completion of writing" or "waiting" in said second storage

means. However, it would have been obvious to one having ordinary skill in the art at

the time the invention was made to incorporate such "reporting completion of writing" for

the second storage means in Kalman since (1) Kalman was already equipped to do so

for the first storage means and (2) such "reporting completion of writing", especially for

the purpose of causing other transfers to wait was critical to data processing systems at

the time of Kalman, to avoid multiple access requests that might cause bus interference

and resulting errors; signals such as "busy" or "request to access" or "access complete"

etc. were very common and widely used to prevent such errors, in asynchronous and

even in some synchronous systems.

7.   Claims 6-7 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Kalman, and further in view of Kakuta (US Patent 5,600,783).

(A)   As per claim 6, Kalman discloses a data writing/reading apparatus for

writing data into storage means (Col 1, Lines 63-66), comprising:

a processor (Fig 1, Ref 12);

a first storage means which has a redundancy structure [Raid provides

parity bits and striping, thus giving a redundancy structure (Fig 1, Ref 23, Col 4, Lines

22-26)]; and

a control unit which writes data in said first storage means in response to a

command from said processor (Fig 1, Ref 22) and includes

a second storage means (Fig 2, Ref 108), and

a logical disk [RAID is a logical disk] writing/reading means for writing data

in said second storage means when instructed by said processor unit (Fig 3A, Ref 216,

218) and reporting completion of writing to said processor unit [the wait of Kalman for

the next data request (Fig 3A, Ref 208) after storing data from request on another

storage medium (Fig 3A, Ref 218) is an indicator of completion], wherein the processor

instructs the writing of data and the control unit writes the data in said second storage

means when a redundancy destruction occurs in said first storage unit (Fig 3A, Ref

204), the data written to said second storage unit corresponding to an address of the

redundancy destruction of said first storage means[The data is written to said second

storage unit corresponding to an address of the redundancy destruction of said first

storage means since the data must placed in such a way that it can be written back

from the NVRAM into the storage medium so that the storage medium can come back

online (Fig 3A, Ref 222)]. Kalman does not disclose reading the data from said second

storage means when a command to read is received from said processor. Kakuta

discloses reading the data from said second storage means when a command to read is

received from said processor. (Col 11, Lines 17-20).

(B)   As per claim 7, Kalman discloses the data writing apparatus according to

claim 6, wherein said control unit (Col 3, Lines 57-61) further comprises a logical disk

[RAID] monitoring means which verifies if said redundancy at said address has been

recovered (Fig 3A, Ref 220), and

when said logical disk monitoring means verifies that said redundancy at

said address has been recovered, said logical disk writing/reading means reads data

written in said second storage means and writes said data at said address in said first

storage means (Fig 3A, Ref 222).

(C)   As per claim 9, Kalman discloses the data writing apparatus according to

claim 6, wherein said second storage means is a non-volatile storage means or volatile

storage means which has an independent power supply (Col 3, Lines 42-49).

(D)   As per claim 10, Kalman discloses the data writing apparatus according to

claim 6, wherein said second storage means retains data, which was written in the

second storage means by said control unit, until said data is subsequently read from the

second storage means by said control unit. [In order to update the drive, data must be

stored until it is written in first storage means (Fig 3A, Ref 222)].

It would have been obvious to one having ordinary skill in the art at the time the

invention was made to incorporate reading data from the second storage device of

Kakuta into the system of Kalman, since Kalman and Kakuta form the same field of

endeavor, namely data requests in a faulty storage array and this would have allowed

for faster access to newly written data (Col 11, Lines 20-21).

8.   Claims 3, 8, 14 and 17 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Kalman as applied to claims 1 6, 12 and 15 above, and further in

view of applicant's description of prior art.

        (A)   As per claim 3, Kalman discloses the data writing apparatus according to

claim 2. Kalman does not disclose the apparatus wherein said logical disk monitoring

means comprises:

                The applicant's specification disclosure of conventional data writing

apparatus discloses the management table updating means which checks a status of

said first storage means and updates a management table (Page 2, lines 4-8);

                Further the applicant's disclosure of conventional data writing apparatus

discloses a timer which informs said management table updating means of a lapse of a

given time period (Page 2, lines 1-3); and

                The applicant's specification disclosure of conventional data writing

apparatus does not disclose write-enableness reporting means which reports recovery

of said redundancy destruction at said corresponding address of said first storage

means to said logical disk writing/reading means when said management table

indicates said recovery of said redundancy destruction.

Kalman discloses write-enableness reporting means which reports

recovery of said redundancy destruction at said corresponding address of said first

storage means to said logical disk writing/reading means (Fig3A, Ref 220) when said

management table indicates said recovery of said redundancy destruction [since

applicant discloses management table checking status of first storage means, it would

have been obvious to one having ordinary skill in the art at the time the invention was

made to use the result of this check to decide when the recovery of redundancy

destruction is complete].

(B)   As per claim 8, please see rejection of claim 3 above. Claim 8 is rejected

for similar reasons.

(C)   As per claim 14, Kalman discloses the method according to claim 12,

Kalman does not disclose the method further comprising the steps of:

C) checking a status of said first storage means when a given time

elapses;

D) updating a management table;

Applicant's description of a conventional data writing apparatus discloses

the steps of:

C) checking a status of said first storage means when a given time elapses

(Page 2, Lines 3-8);

D) updating a management table [it is obvious that the management table

updating means updates a management table];

Kalman further discloses the steps of:

E) reading data written in said second storage means when said management table indicates recovery of said redundancy [since applicant discloses management table checking status of first storage means, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the result of this check to decide when the recovery of redundancy destruction is complete (Col 4, Lines 47-52)]; and

F) writing said data at said address in said first storage means (Col 4, Lines 47-52).

(D)   As per claim 17, please see rejection of claim 14 above. Claim 17 is rejected for similar reasons.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the management table updating means and timer of applicant's disclosure of prior art into the system of Kalman, since Kalman and applicant form the same field of endeavor, namely data accesses in disc array and applicant describes a conventional data writing apparatus, and the combination would have allowed a structure for consistent updates of management table.

Conclusion

9.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Peikari whose telephone number is (571) 272-

4185. The examiner is generally available between 7:00 am and 7:30 pm, EST,

Monday through Wednesday, and between 5:30 am and 4:00 pm on Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Reginald Bragdon, can be reached at (571) 272-4204. The fax phone

number for the organization where this application or proceeding is assigned is 571-

273-8300.

Information regarding the status of an application may be obtained from the

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Business Center at 866-217-9197 (toll-free).
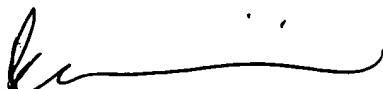
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7/24/06